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Arnold et al.

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(54) **CABLE MANAGEMENT DEVICE**

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F16L 3/12 (2006.01)

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CPC ***H02G 3/0456*** (2013.01); ***F16L 3/12*** (2013.01)

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USPC 248/74.1, 222.51, 222.52
See application file for complete search history.

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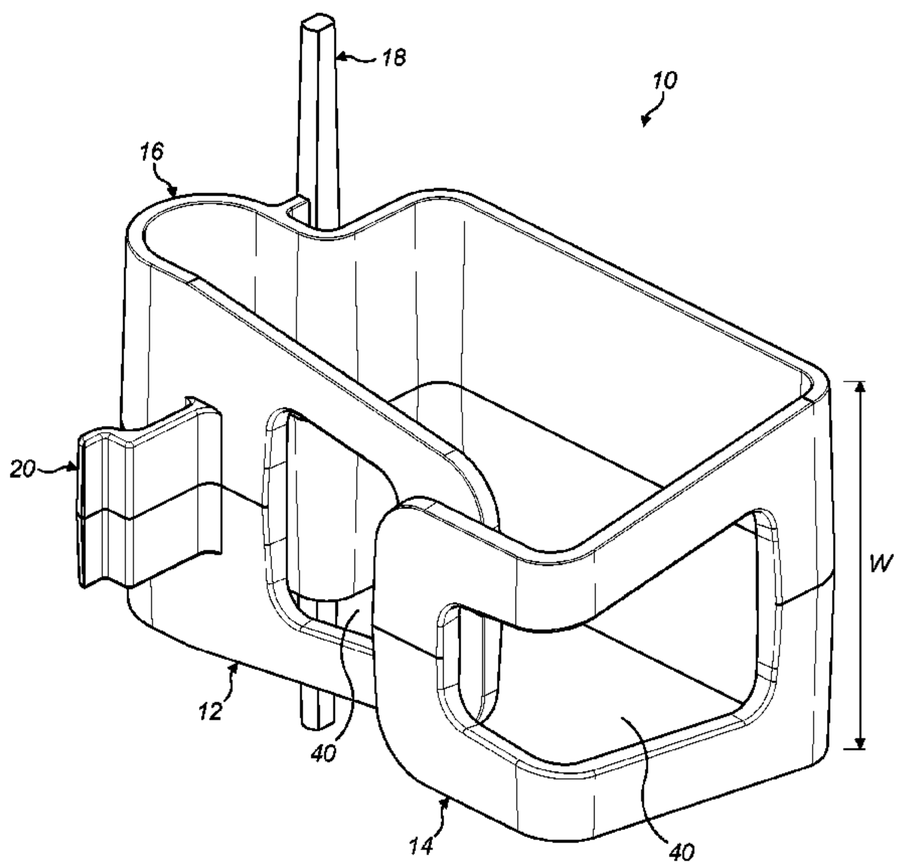
(57) **ABSTRACT**

A cable management device comprises first and second arms and a base together defining an enclosure for one or more cables. The device includes an attachment and spacer device and a stabilizing clip to releasably attach the device to a support element and to space the enclosures of adjacent devices from one another.

8 Claims, 4 Drawing Sheets



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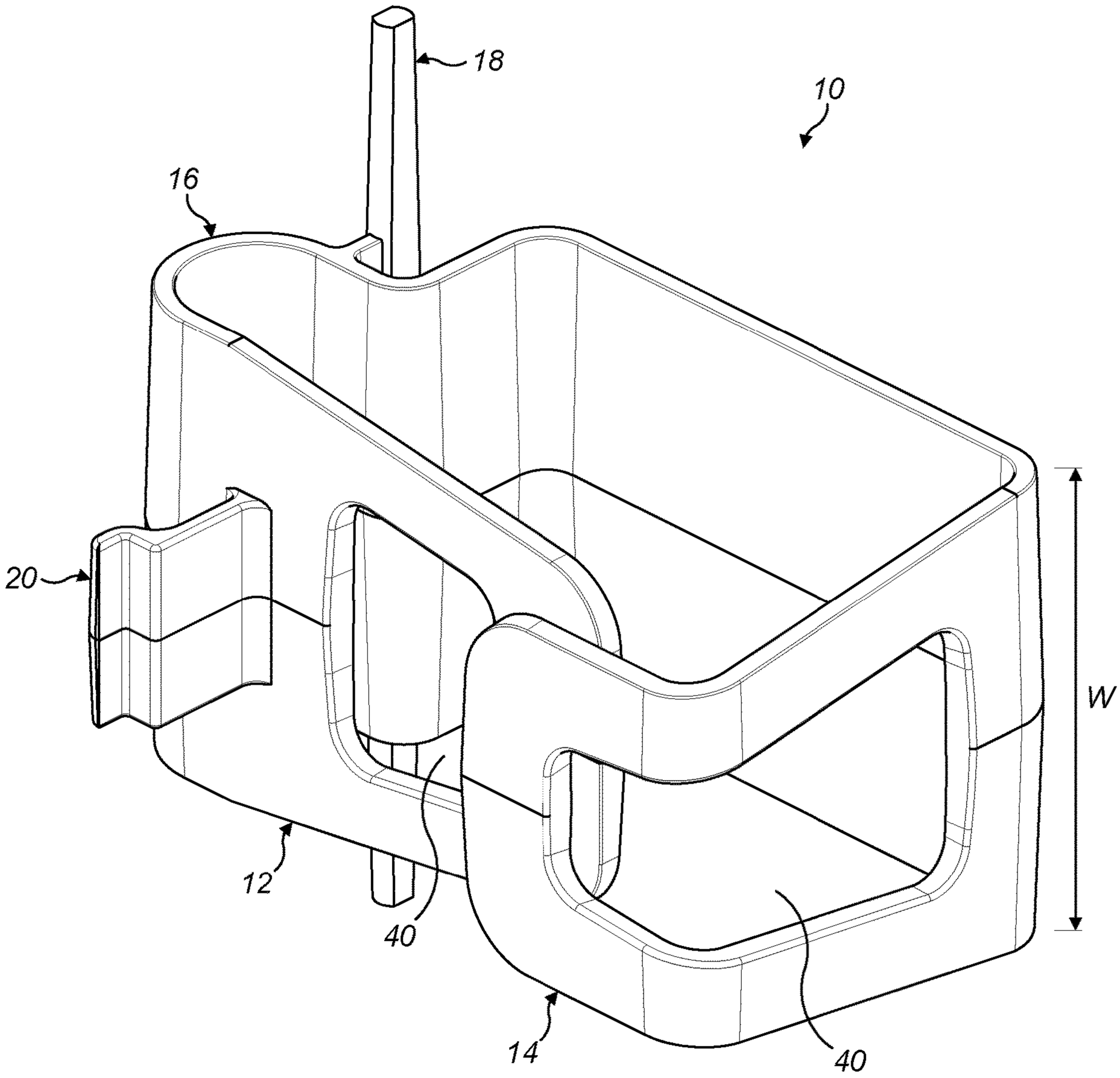

FIG. 1

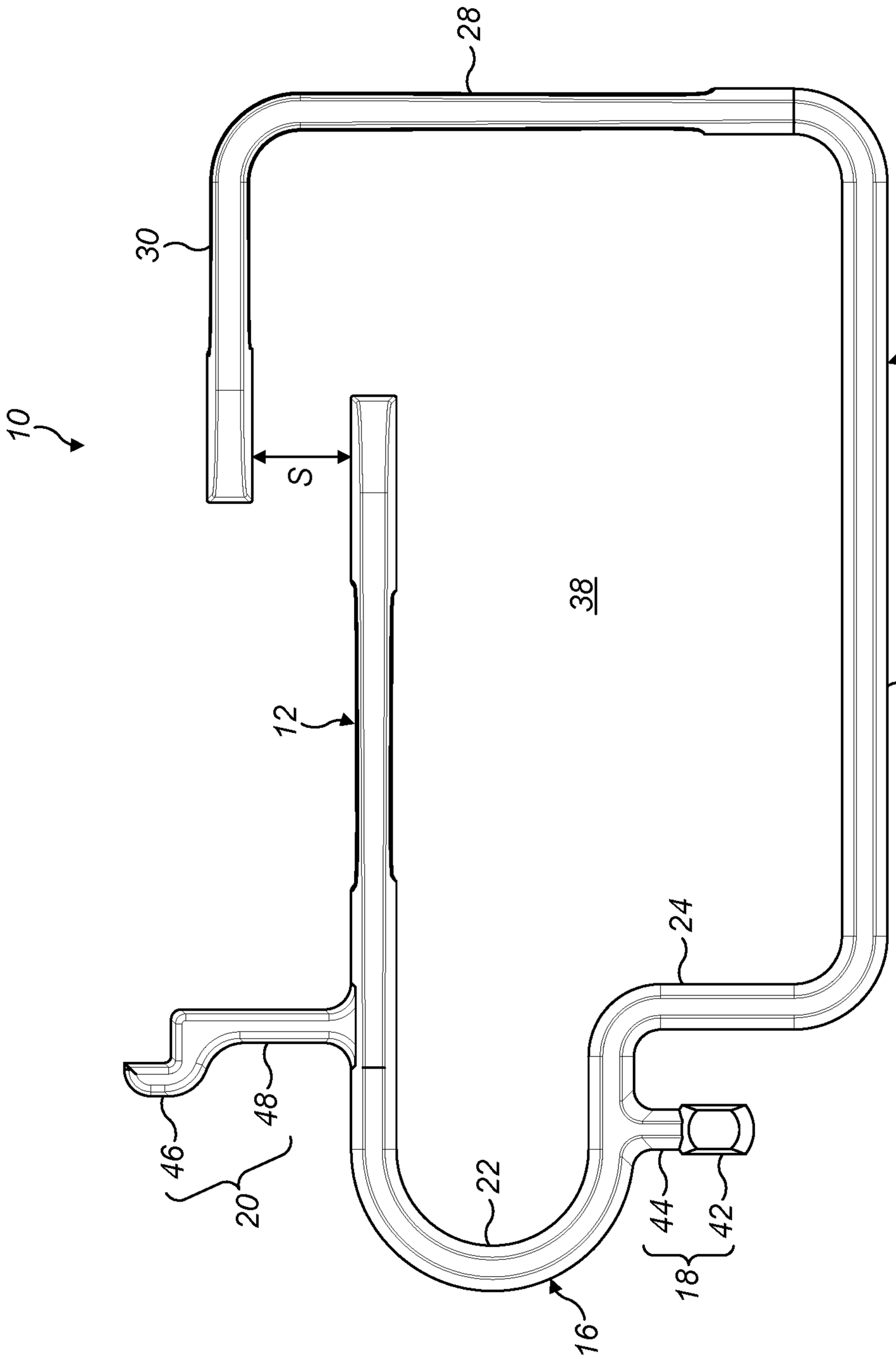

FIG. 2

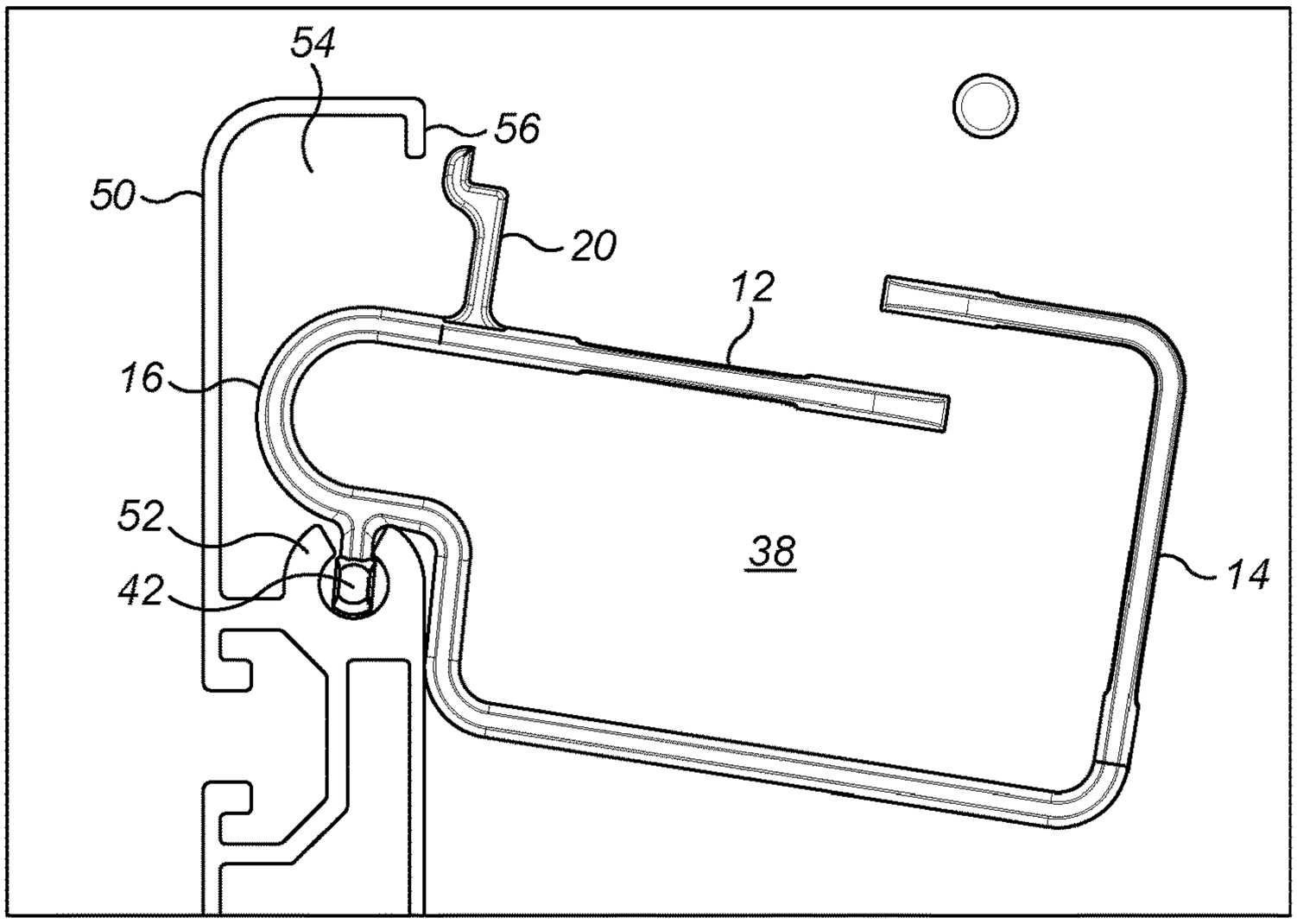

FIG. 3

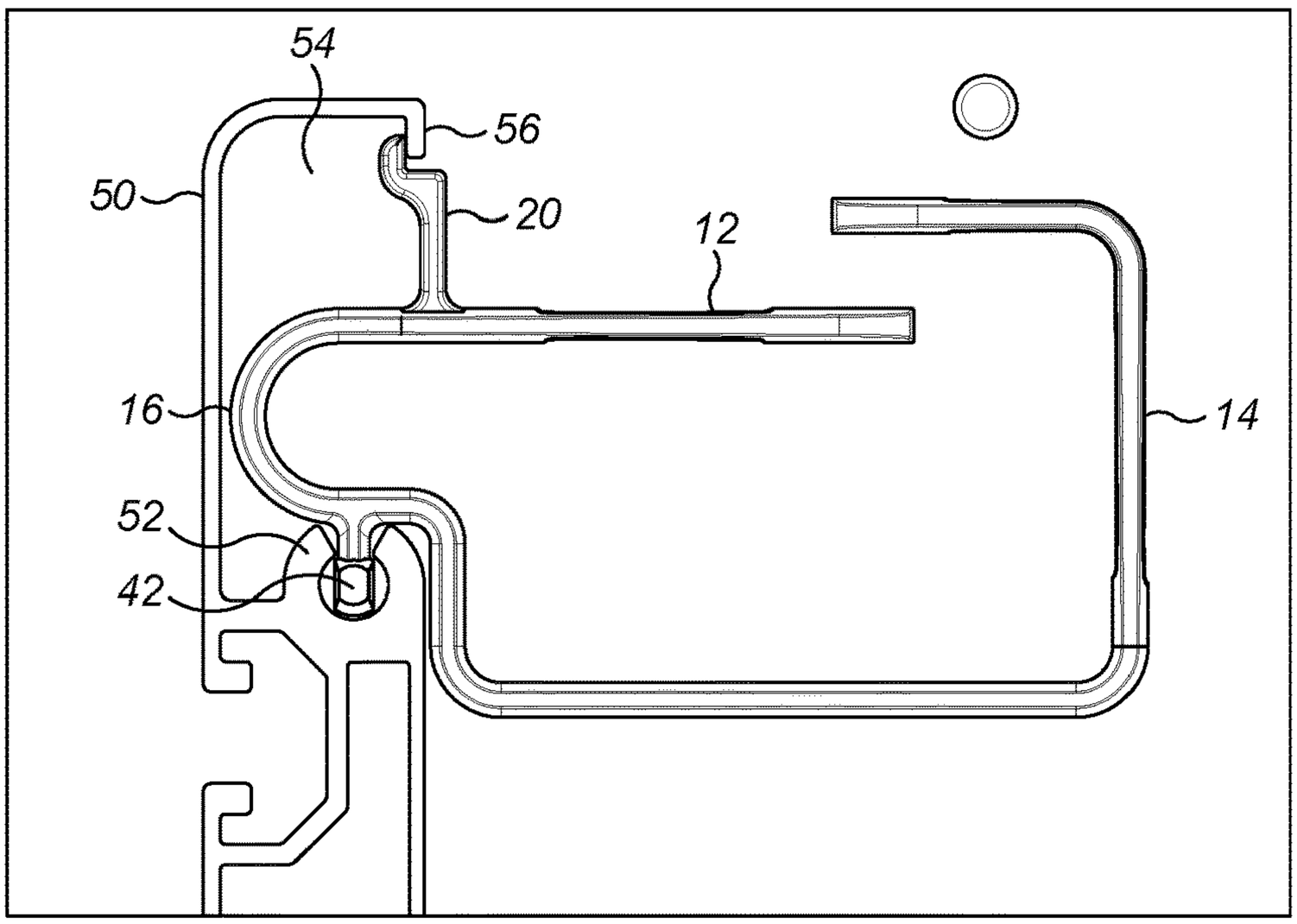

FIG. 4

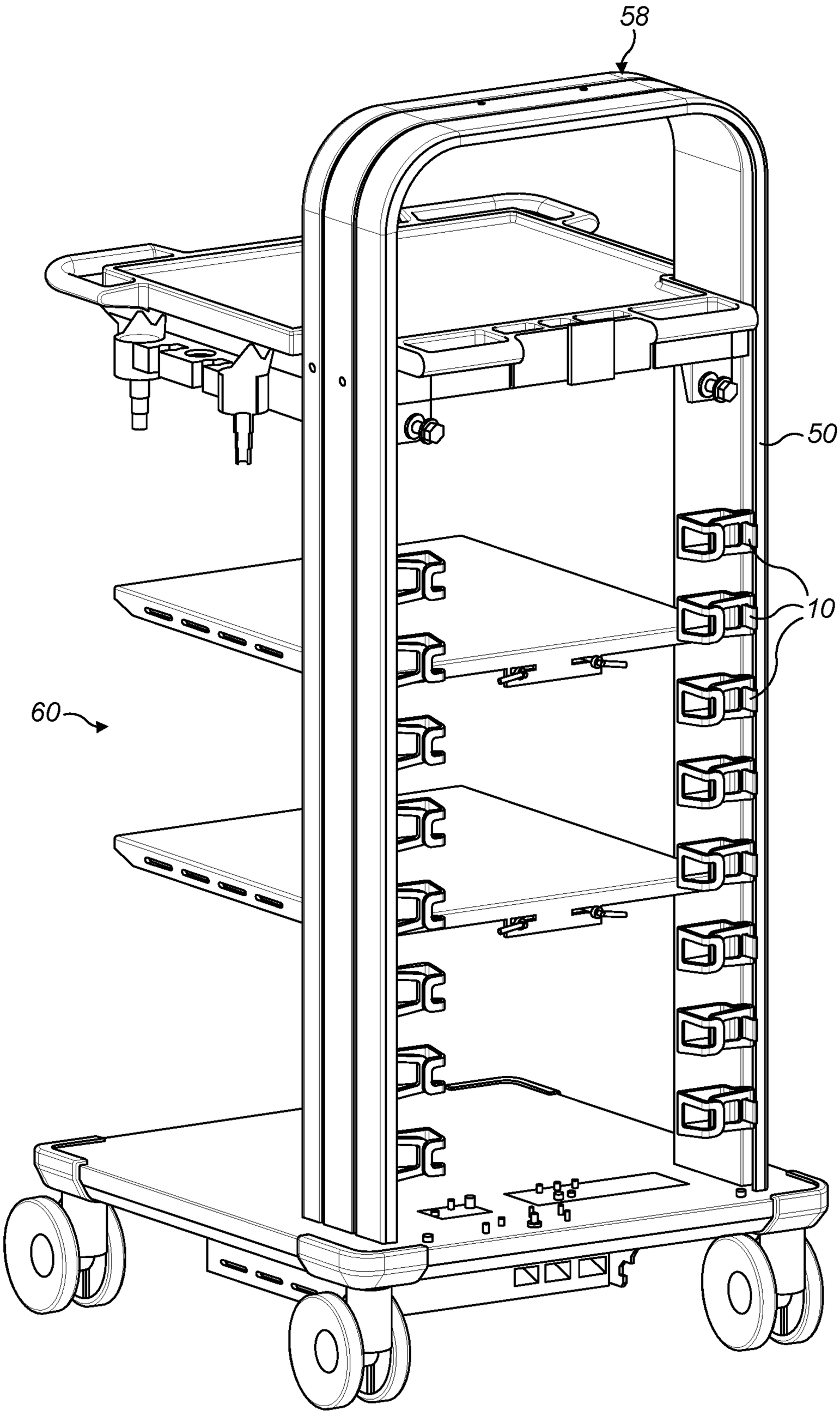

FIG. 5

CABLE MANAGEMENT DEVICE

CROSS-REFERENCE TO RELATED APPLICATIONS

This patent application claims the benefit of United Kingdom Patent Application No. 2000943.7, filed Jan. 22, 2020, which is incorporated herein by reference for all purposes.

BACKGROUND OF THE INVENTION

The present invention relates to a cable management device and a modular cable management system incorporating a plurality of the cable management devices.

Numerous different forms of cable management device exist. For example, U.S. Pat. Nos. 6,427,952 and 5,921,402 disclose cable retaining brackets which can be mounted on a surface or track. U.S. Pat. Nos. 8,985,530, 9,188,248 and 5,893,539 disclose systems with an elongate spine carrying a number of cable retaining rings. US2015/0086373 discloses a cable management system with a bracket defining a number of receptacles or compartments for keeping multiple cables of groups of cables separate. Nevertheless, a need remains for a simple, stable cable management device which can accommodate numerous cables, which can easy be built up into a modular cable management system.

SUMMARY OF THE INVENTION

The present invention provides a cable management device comprising a base and first and second arms extending from the base in a first direction, the base and the arms together defining an enclosure for receiving one or more cables, and a first attachment device configured to releasably attach the cable management device to a support element, the first attachment device comprising an elongate rod attached to the base portion and extending in a second direction perpendicular to the first direction, wherein the base and the arms have a width dimension in the second direction and the length of the elongate rod is greater than the width dimension so that the rod extends beyond each side of the enclosure.

The first attachment device thus acts both to attach the cable management device to a support element and to space the enclosures of adjacent cable management devices from one another.

Preferably the elongate rod extends in the second direction an equal distance on either side of the enclosure.

The cable management device may further comprise a second attachment device configured to releasably attach the cable management device to a support element and joined to the base at a location spaced from the first attachment device. This ensures the cable management device is firm and stable when fitted to a support element.

The base may comprise a U-shaped portion, which provides strength and flexibility. In this case, the first and second attachment devices are preferably joined to the base on opposite sides of the U-shaped portion. The first and second attachment devices may each be joined to the base by a connecting rib.

Preferably, the distal ends of the arms remote from the base overlap one another with a spacing therebetween, to facilitate a cable entering and exiting the enclosure. In addition, the width of the arms may decrease in the first direction extending from the base towards the distal ends.

Also, at least one aperture may be formed in one or both arms. These features improve visibility and accessibility of cables held in the enclosure.

The present invention also provides a cable management system comprising a support element in combination with a plurality of cable management devices as wherein the support element defines at least one elongate channel configured to releasable receive the first attachment device of the cable management devices.

Preferably, the support element further defines a second elongate channel for receiving the base of the cable management devices. In this case, the first channel may be formed on one side of the second channel and on the opposite side the second channel comprises a lip for releasable engagement with the second attachment device of the cable management devices.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

The present invention will now be described in detail, by way of example only, with reference to the accompanying drawings in which:

FIG. **1** is a perspective view of one embodiment of cable management device in accordance with the present invention;

FIG. **2** is a plan view of the cable management device in FIG. **1**, from below;

FIG. **3** shows a cross section of a support member with a cable management device partly fitted;

FIG. **4** is similar to FIG. **3** but shows the cable management device fully engaged with the support member; and

FIG. **5** is a perspective view of a trolley for carrying electrical equipment incorporating a cable management system in accordance with the present invention.

DETAILED DESCRIPTION OF THE INVENTION

As best seen in FIGS. **1** and **2**, a cable management device **10** in accordance with one embodiment of the present invention comprises first and second arms **12**, **14** extending in a first direction from a base portion **16**. The device **10** is typically a one-piece integral plastic moulding and therefore there is no strict delineation between the arms and the base portion but these terms are used herein for explaining the structure of the device **10**.

In this example, the base portion **16** comprises a U-shaped portion **22** with a lateral extension **24** extending from the end of one limb of the U. The first arm **12** extends straight from the other limb of the U-shaped portion **22**.

The second arm **14** includes a proximal portion **26** extending from the lateral extension **24**, substantially perpendicular thereto and substantially parallel with the first arm **12**. The second arm **14** further comprises a mid-portion **28** substantially perpendicular to and extending towards the first arm **12**, and a distal portion **30** substantially parallel to the first arm **12** and extending back towards the base **16**.

The distal portion **30** overlaps the distal end of the first arm **12**. The overlapping portions are spaced apart as shown by arrow S. The spacing S is preferably greater than at least the diameter of one cable of the type intended to be held by the cable management device **10**.

Thus, the first and second arms **12**, **14** and the base **16** together define a cable enclosure **38**. The configuration of the base **16** with a U-shaped portion **22** allows some flexing of the arms **12**,**14** in use, which can be helpful when cables

are fitted into and removed from the enclosure **38**. The precise shape and configuration of the arms and base can of course differ. For example, the enclosure may be substantially C-shaped or G-shaped, or other variations, provided that an area for receiving cables is defined and the arms are spaced apart or separable to some extent to allow cables to enter and exit the enclosure **38**.

Preferably, at the distal ends of the first and second arms **12**, **14**, the corners **32**, **34** are rounded to avoid any sharp edges which might damage cables.

As shown in FIG. **1**, the first and second arms **12**, **14** have a width dimension W which is preferably at a maximum adjacent the base portion **16** and decreases towards the distal ends. The arms **12**, **14** may include one or more apertures **40**. These features reduce the amount of material and the weight of cable management device **10** and provide enhanced visibility and accessibility of a cable bundle held within the enclosure **38** in use.

The cable management device **10** further comprises an attachment and spacer device **18** for attaching the device **10** to a support **50**, as described further below, and a stabilizing clip **20**.

The attachment and spacer device **18** comprises an elongate rod **42** joined to the base portion **16**, preferably by a connecting rib **44**. The rod **42** extends in a second direction, perpendicular to the first direction in which the arms **12**, **14** extend away from the base **16**, and is generally parallel to the width dimension W of the arms **12**, **14**. The length of the rod **42** is greater than the maximum width dimension of the arms **12**, **14** and the base portion **16**. Preferably the rod **42** is symmetrical about the base portion **16** and extends by a distance D both above and below the base portion **16**.

Preferably, the cable management device **10** also comprises a stabilizing clip **20** which comprises a generally L-shaped bracket **46** connected to the base portion **16**, such as by a second connecting rib **48**. Preferably, the attachment and spacer device **18** and the stabilizing clip **20** are connected to opposite sides of the U-shaped portion **22** of the base **16**.

The attachment and spacer device **18** and the clip **20** are configured to releasably attach the cable management device **10** to a support member **50** and to space the enclosures **38** of adjacent cable management devices **10** from one another. In one example, a support member **50** comprises an elongate element, typically formed by extrusion, which defines a number of internal channels.

As shown in FIGS. **3** and **4**, in one embodiment, the support element **50** defines a first channel **52** for releasably receiving a rod **42** of a cable management device **10**. The support member also defines a second channel **54** for receiving the U-shaped portion **22** of the base **16**. The support member **50** is formed with a lip **56** at the side of the second channel **54** opposite to the location of the first channel **52**. The L-shaped bracket **46** of the cable management device **10** is releasably engageable with the lip **56**. In this way, a cable management device **10** can be stably fitted to the support member **50** and is braced against both sides of the second channel **54**. This ensures the cable management device **10** is held firmly, making it easier to fit and remove cables, and it resists pivoting about the rod **42**, which might break the connecting rib **44**.

As shown in FIG. **5**, in one example the support member **50** is part of a vertical frame **58** mounted on a wheeled trolley or workstation **60** which also carries a number of shelves for supporting electrical equipment requiring multiple cables. A series of cable management devices **10** can be fitted to the support element **50** to define a pathway for receiving the electrical cables.

Due to the length of the rod **42**, when a first cable management device **10** is fitted at the bottom of the support member **50**, the base portion **16** and arms **12**, **14**, and thus the enclosure **38**, are spaced above the base of the workstation **60** by a distance D. When a subsequent cable management device **10** is fitted, the lower end of its rod **42** will abut the top end of the rod **42** of the first cable management device **10**. Thus, the enclosures **38** of the two cable management devices **10** will be spaced apart by a distance 2D. This will be repeated as further cable management devices **10** are fitted to the support element **50**.

In this way, a series of enclosures **38** are provided one above the other to accommodate a bundle of cables. However, since the enclosures **38** of adjacent cable management devices **10** are spaced apart by a distance 2D, there is improved visibility and accessibility of the bundle of cables. This is further enhanced by the apertures **40** formed in the arms **12**, **14**. If it is necessary to add or remove one or more cables from the bundle, it is easier to identify the relevant cable and manoeuvre it into or out of the enclosures **38** while leaving the other cables in place. Cables needed for equipment on a given shelf can be diverted from the main bundle and passed out through the spacing between two adjacent cable management devices **10** but do not need to be bent at a sharp angle to do so.

Each cable management device **10** is securely retained in the support member **50** due to the two opposing attachment means provided by the attachment and spacer device **18** and the stabilizing clip **20**.

Thus, the invention provides an improved cable management device which is capable of securely retaining a bundle of cables and which can be combined with other cable management devices to form a modular cable management system which can be as long or short as desired. Individual cable management devices can be clipped in and out of a support member **50** without disassembly of the entire system and the integral spacer provided by rod **42** allows easier access to a cable bundle in use.

The invention claimed is:

1. A cable management system comprising

a support element in combination with a plurality of cable management devices,

each cable management device comprising a base portion and first and second arms extending from the base portion in a first direction, the base portion and the arms together defining an enclosure for receiving one or more cables, and a first attachment device and a second attachment device, the first attachment device being configured to releasably attach the cable management device to the support element, the first attachment device comprising an elongate rod attached to the base portion and extending in a second direction perpendicular to the first direction, wherein the base portion and the arms have a width dimension in the second direction, a length of the elongate rod being greater than the width dimensions of the base portion and the arms so that the rod extends beyond each side of the enclosure, the second attachment device being configured to releasably attach the cable management device to the support element and joined to the base portion at a location spaced from the first attachment device, wherein

the support element including at least one first elongate channel configured to releasably receive the first attachment device of each of the cable management devices, and a second elongate channel for receiving the base portion of the cable management devices, wherein the first channel is formed on one side of the second channel and an opposite side the second channel comprises a lip for releasable engagement with the second attachment device of the cable management devices, and

wherein, in assembly, the elongated rod is disposed in the first elongate channel to partially fit the cable management device in the support element, and the cable management device is then pivoted to position the base portion in the second elongate channel and to fully engage the second attachment device with the lip.

2. A cable management system as claimed in claim **1**, wherein the elongate rod extends in the second direction an equal distance on either side of the enclosure.

3. A cable management system as claimed in claim **1**, wherein the base portion comprises a U-shaped portion.

4. A cable management system as claimed in claim **3**, wherein the first and second attachment devices are joined to the base portion on opposite sides of the U-shaped portion.

5. A cable management system as claimed in claim **4**, wherein the first and second attachment devices are each joined to the base portion by a connecting rib.

6. A cable management system as claimed in claim **1**, wherein the second arm further comprises a proximal portion substantially parallel to the first arm, a mid-portion substantially perpendicular to and extending towards the first arm and a distal portion substantially parallel to the first arm and extending back towards the base portion, and wherein distal ends of the arms remote from the base portion overlap one another with a spacing therebetween.

7. A cable management system as claimed in claim **1**, wherein the width of the arms decreases from the base portion towards distal ends of the arms.

8. A cable management system as claimed in claim **1**, further comprising at least one aperture formed in one or both arms.

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